

Participatory Approaches to Metadata Design for Scientific Data Accessibility

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Espaces
COmmuns de DOcumentation

ECODOC



ECODOC

ECODOC is a citizen science project in the social sciences that studies the conditions for the appropriation of scientific information in areas undergoing climate transition.

The aim is to work with information professionals (mediators, librarians, researchers) and citizens to co-develop services/tools that improve access to scientific information, in particular by working on the visualization of information and data.

Finally, ECODOC works from a corpus of documents and data on forest ecology, because our region has many forests and is unfortunately experiencing an increase in fires.

The challenge of diversity

Diversity of scientific documents: a corpus of scientific documents in various forms and formats, of varying complexity and related to a range of projects in forest ecology.

Diversity of access: one or more services/tools that can be used in different places and by different people:

- *in a library: as a tool for accessing scientific documents*
- *in a classroom: as an educational tool*
- *in a forest: as a mediation tool*

Challenge: to devise a variety of ways of visualizing and therefore organizing information to take into account the multiple uses and ways of reading documents and data.

Working on relationships

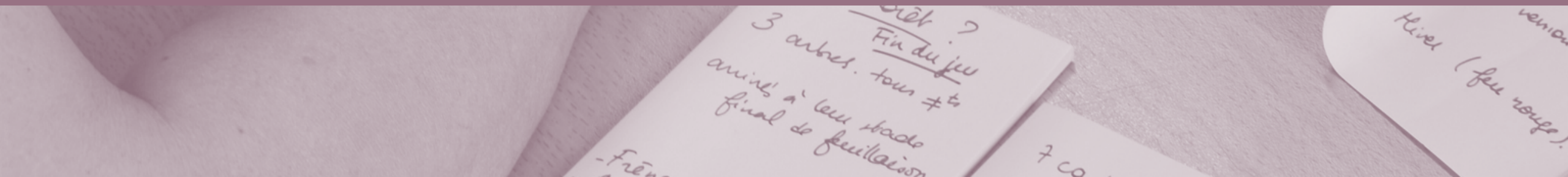
1. How can documents be organized so that they interact with each other? What principles should guide this interaction? How can this interaction reflect the issues faced by citizens in situations of adaptation? **LINKING documents**
2. How can we ensure that these documents can be understood and read by non-experts? How can we ensure that these documents can be read from different perspectives? **READING documents**

RELATIONSHIPS >>> How **can we describe** (scientific) **documents** to offer a variety of **reading paths**? What metadata should be used to narrate the scientific project?



Step 1: The scientific narrative

Mapping the scientists' narrative

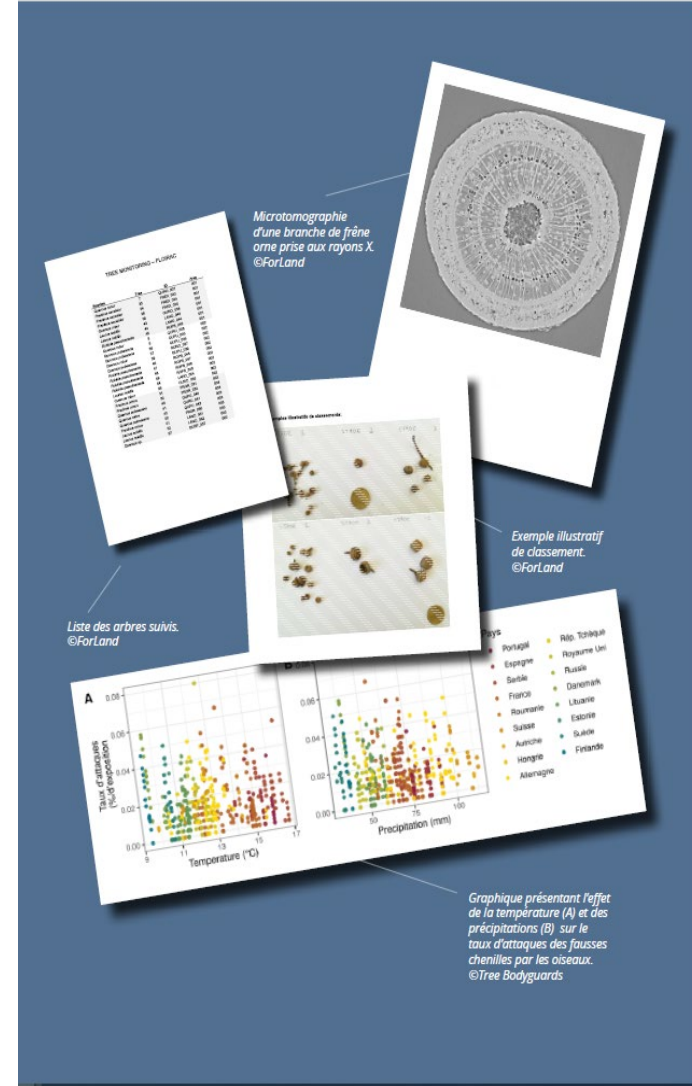


The scientists' narrative

Interviews with three forest ecology researchers about four research projects: Water Stress, Bud Break and Senescence, Oak Fruit Production, Trees and Predators (**FORLand**: Déborah Corso, Thomas Caignard, and **Tree Bodyguards**: Bastien Castagneyrol)

Identify the elements of their story:

- scientific/non-scientific, academic/non-academic, media, educational, artistic, etc.
- protocols, photos of sensors, raw data (figures, scans, etc.), processed data (code, graphs), articles.

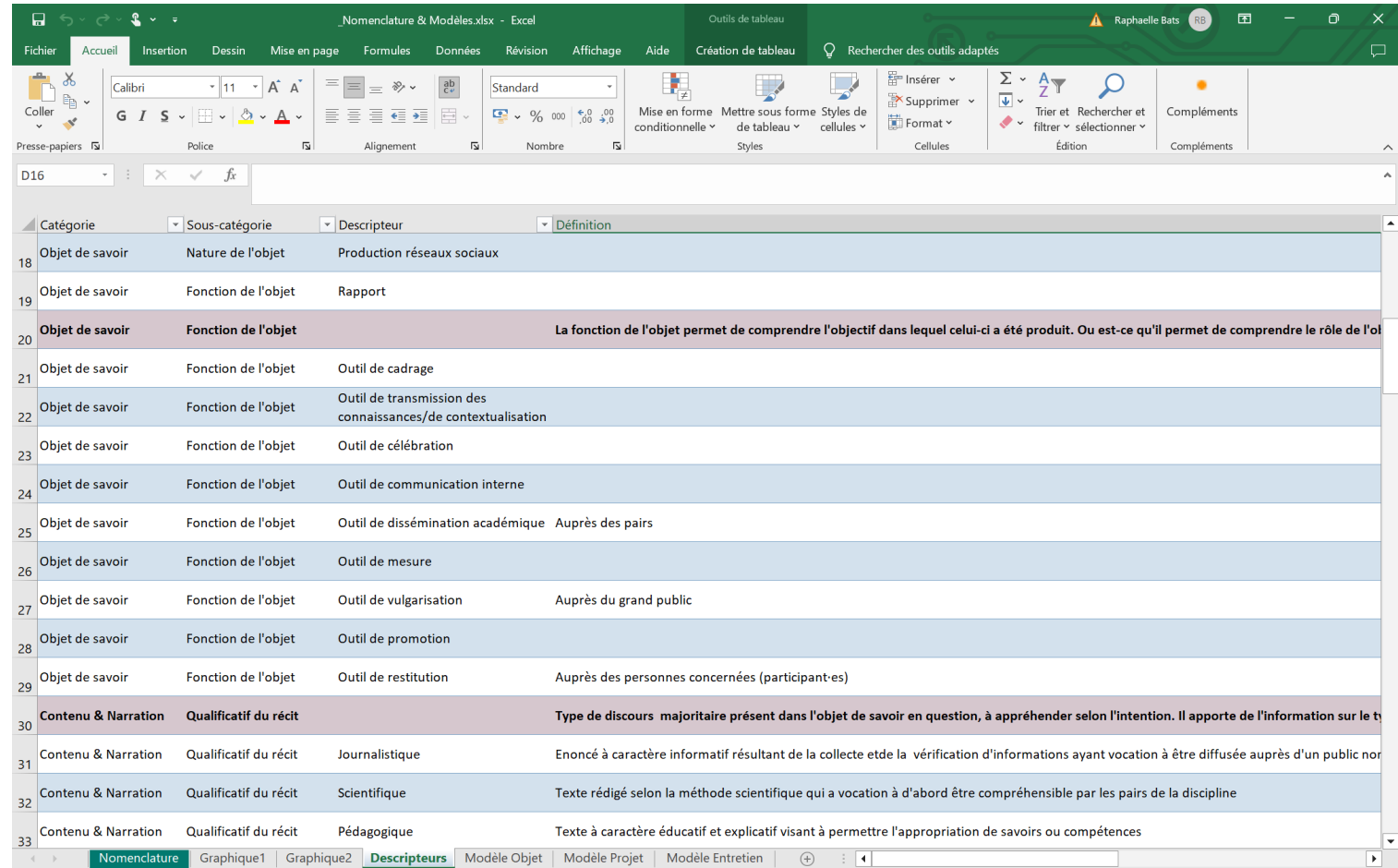


Mapping and nomenclature

Drafting a nomenclature to define knowledge repositories and highlight relationships between documents.

> Metadata constructed by social science researchers

Each piece of metadata links documents together and provides an account of the scientific project from a specific perspective.



Catégorie	Sous-catégorie	Descripteur	Définition
Objet de savoir	Nature de l'objet	Production réseaux sociaux	
Objet de savoir	Fonction de l'objet	Rapport	
Objet de savoir	Fonction de l'objet		La fonction de l'objet permet de comprendre l'objectif dans lequel celui-ci a été produit. Ou est-ce qu'il permet de comprendre le rôle de l'objet ?
Objet de savoir	Fonction de l'objet	Outil de cadrage	
Objet de savoir	Fonction de l'objet	Outil de transmission des connaissances/de contextualisation	
Objet de savoir	Fonction de l'objet	Outil de célébration	
Objet de savoir	Fonction de l'objet	Outil de communication interne	
Objet de savoir	Fonction de l'objet	Outil de dissémination académique	Auprès des pairs
Objet de savoir	Fonction de l'objet	Outil de mesure	
Objet de savoir	Fonction de l'objet	Outil de vulgarisation	Auprès du grand public
Objet de savoir	Fonction de l'objet	Outil de promotion	
Objet de savoir	Fonction de l'objet	Outil de restitution	Auprès des personnes concernées (participant·es)
Contenu & Narration	Qualificatif du récit		Type de discours majoritaire présent dans l'objet de savoir en question, à appréhender selon l'intention. Il apporte de l'information sur le type de discours.
Contenu & Narration	Qualificatif du récit	Journalistique	Enoncé à caractère informatif résultant de la collecte et de la vérification d'informations ayant vocation à être diffusée auprès d'un public non spécialisé.
Contenu & Narration	Qualificatif du récit	Scientifique	Texte rédigé selon la méthode scientifique qui a vocation à d'abord être compréhensible par les pairs de la discipline.
Contenu & Narration	Qualificatif du récit	Pédagogique	Texte à caractère éducatif et explicatif visant à permettre l'appropriation de savoirs ou compétences.

First metadata

Document			
Title	Production	Nature	Fonction

Authors			
Age	Nature/ status	Quantity	Type of contribution

Forme & Format				
Forme	Forme détaillée	Matérialité de l'objet	Si numérique, extension du fichier	Intermédiaire technique

Temporality of productions		
Stage in Research Process	Date	Produced after ...

Content and Narratives						
Content as described in interview	Issues as described in interviews	Type of narratives	Protagonists	Key-words as described in interview	Recipients of production	Proof of Reception

Acces								
Open Access	Online on the project Website	Repositories	Détails	Providers	Détails	Réceptients of diffusion	Proof of Reception	Date of diffusion

Relationships, metadata, narratives: 1/2



ECODOC: Relationships

Relationships: READ and CONNECT

How can we **describe** (scientific) **documents** in order to offer **different/other ways of reading** them than those intended by the researchers?

What metadata should be used for lay narratives of scientific projects?

A lay narrative of the scientific project

- Listening to non-scientific narratives: paying attention to other forms of intelligibility
- Seeing the emergence of issues in descriptions that do not relate to science, but to their ways of observing the world
- Make the connection between narrative and experiential knowledge.

"The use of more or less abstract terms does not depend on intellectual capacity, but on the unevenly marked and detailed interests of each particular society within the national society. (...) As in professional languages, conceptual proliferation corresponds to a more sustained attention to the properties of reality, to an awakened interest in the distinctions that can be introduced into it." (Levi-Strauss, 1962, pp. 12-13).

For non-scientists, other descriptions of the scientific project are important, because in their account of the project they do not describe the same **reality** as researchers.

The profane and the sensitive

Reality as something that leaves a mark, an imprint on the narrator: being able to express it

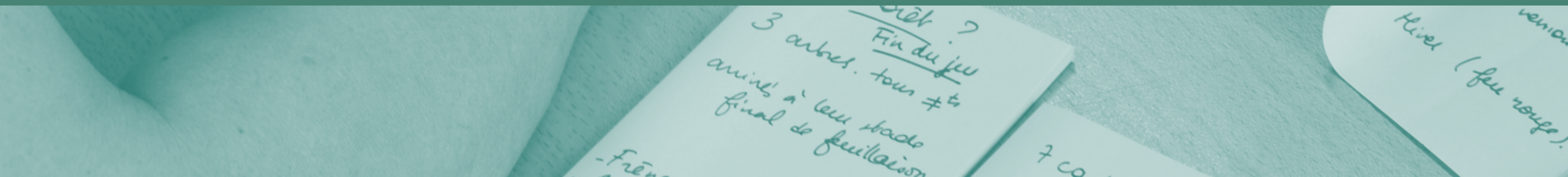
Reality: that which concerns us, that to which we give meaning: Attention to future uses and users upstream of the production of the device: relationship to the problem rather than to the tool

RELATIONSHIP, NARRATIVE, and SENSITIVE: How can we think about the link between the expression of these imprints and the organization of information?

We did this by organizing sensory workshops: workshops on reappropriating scientific data through approaches based on an emotional grasp of information, so as to bring out the participants' concerns and be able to visualize them.



Sensitive workshops



1: Communicating science



Communicating science

2.1 « Raconter la science » Ateliers de narration du récit scientifique

La manière dont on présente un projet de recherche est une forme de récit. On peut raconter le projet en suivant son processus, comme on le ferait dans un article, ou le raconter d'un point de vue subjectif en suivant le regard du/de la chercheur·euse qui l'a pensé et conduit. Ou peut-être encore en proposer d'autres récits. Chacun de ces récits reflète, à travers sa lecture du projet, un rapport à l'objet étudié, à la science, à ses acteur·rices et, de fait, est susceptible de nous informer sur les préoccupations et les sensibilités de ces lecteur·rices/narrateur·rices du projet.

Les ateliers « Raconter la science » ont pour objectif de travailler sur la construction de récits variés qui permettent d'envisager de multiples façons de raconter le projet de recherche. L'atelier peut servir de base de travail pour des chercheur·ses en situation de médiation ou pour des chargé·es de médiation scientifique. Dans ce cas, il sera mené en équipe de professionnel·les concerné·es par le projet.

Workshops on organizing scientific knowledge to make it more accessible

Two workshops organized as part of ECODOC:
with the steering committee and with librarians



©Emilie Clément

Cependant, ces ateliers peuvent aussi se mener avec tous types de participant·es pour leur permettre de découvrir un projet de recherche en se l'appropriant, en s'autorisant à construire et suivre des parcours de lecture singuliers, originaux qui créent autant de nouvelles promenades au cœur des documents scientifiques.

Variations in narratives

Bringing out the relationships between different types of knowledge within these files, in order to develop a methodology for defining and describing these relationships with a view to analyzing them.

Sensitive: giving meaning based on what gives meaning to us.



Scientific methodology



in "bulk"



following the thread

Organized reality

The need for explanations, depth, and additional information to reveal what the research uncovers step by step.

This involves following an acorn, a method of field observation, the researcher's path, the evolution of the forest over a year, etc.

>>>> Specify the content by location, date, population, environment, tools and instruments, etc.

This is all the more evident as variations in narratives have given rise to material visualizations of relationships.



2: From tree to leaf

"From Tree to Leaf" Workshops

Science slam workshops or scientific data slam

Conducted with local residents

In partnership with Street Def Records

To encourage participants to produce new narratives about science

Through emotion and sensitivity: the relationship between art and science: feeling and expressing, and in particular expressing one's concerns.

October 2023 > October 2024 (and beyond)

Locations

- 11 workshops
- Libraries, forest, campus
- Duration: 1 hour 15 minutes to 4 hours

Participants

- 146 people
- Ages 11 to 83
- Ulis class, 1 person in nursing home

Texts

- 152 texts
- From 6 lines to 5 pages



Narrating science

Writing a slam poem
based on scientific
documents about
forests, one year after
the fires:

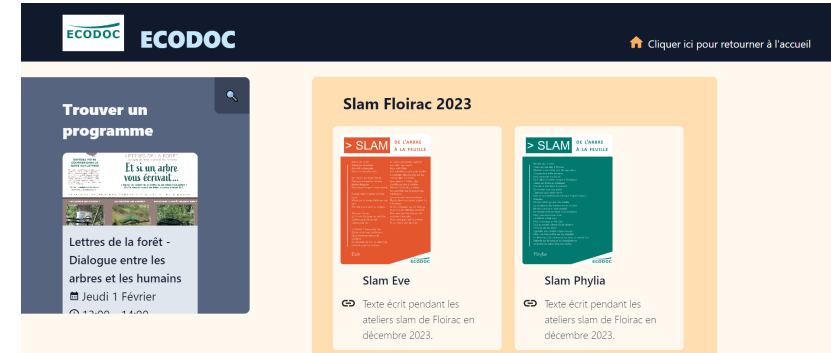
- active practice of information,
- expressing concerns,
- moving to the personal level

“
Bientôt plus le time
J'pourrais pas aller à Monaco
Modeler la vie c'était plus dur que prévu
J'croyais être enfin peinarde
Mais personne m'avait dit
Qu'il fallait se battre comme à Stalingrad
J'étais sûr d'être un prédateur
Il aurait pt'être fallu m'prévenir
Qu'on était tous des proies
J'pensais avoir atteint la fin
Mais ça ne s'arrêtera pas tant que le geai moqueur chantera
Réussir c'était qu'une idée zombie
La complexité des interactions en société
Ne fait que nourrir mon anxiété
Un chemin linéaire c'était c'que j'espérais
Mais j'erre entre mes choix
La théorie c'était easy
Mais la pratique ça fait chier
Seul au monde comme Chuck Noland
J'trouve pas ma place
J'grandis, mes feuilles s'épanouissent
Mais j'me fais bouffer par les chenilles
En définitive j'vis comme un fou dans un monde flou
Débordé par la haine et les changements
Je chante ma peine dans mes textes

Poeticizing science

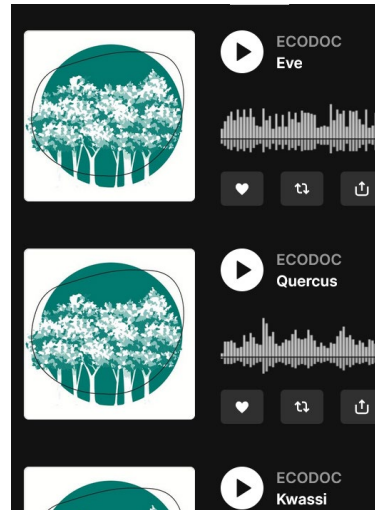
Read the texts?

- Kronikle: the texts are online
- Instagram: the texts are being shared
- The science slam collection: publication
- Some audio clips on SoundCloud

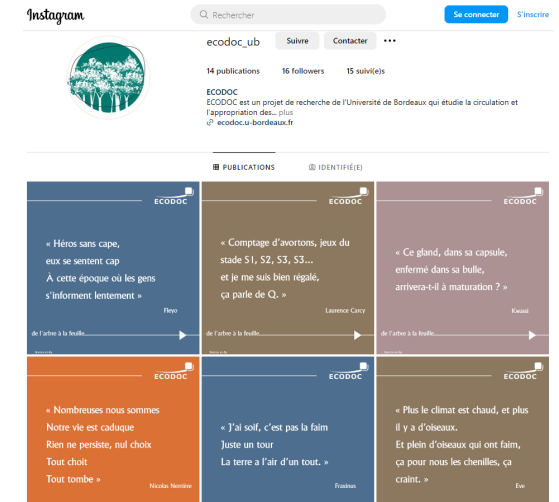


<https://app.kronikle.eu/d/65784d0f016c5105d3b8>

<https://ecodoc.u-bordeaux.fr/actualites/recueil-de-science-slamee>



<https://soundcloud.com/ecodoc33/tracks>



@ecodoc_UB:
https://www.instagram.com/ecodoc_ub/

The tangible reality

Slam texts express intimate and unique concerns (education, society, solidarity) >>> poetic and sensitive expression of what science encounters in the reality of its readers.

Highly personal perspectives on reality that are complex to infer in terms of metadata = manifestation of a unique and singular reading (person, time, space).

Example:

- *Initial description of the project on trees and predators: "Study of the effects of climate change on bird species diversity and their ability to prey on herbivorous insects that attack oak trees."*
- *The slam texts highlight the words: "birds, caterpillars, oak trees, predator, diversity, predation, model, song, jay, climate, tree." In other words, only three words coincide: birds, predation, and oak.*

These words do not present any "errors" in the project. They highlight methodological aspects that the terms chosen by the researchers do not show. They give more substance to the project than the original description. A reality that is more widely shared than that of the researchers.

3 – Boussole (Compass)



The "Compass" workshops

Design one or more ways to visualize these directories and the readings we can get from them.

- Understand participants' "pebbles" in relation to forests and scientific information
- Propose paths (scripted data).
- Encourage personalized paths (personalized readings).
- Sensitive: give meaning based on what gives meaning to us.

May to September 2025

- 5 workshops + 1 iteration workshop
- Library, campus, forest, tourist office, table tennis room, librarians' conference
- Duration: 50 minutes to

Locations



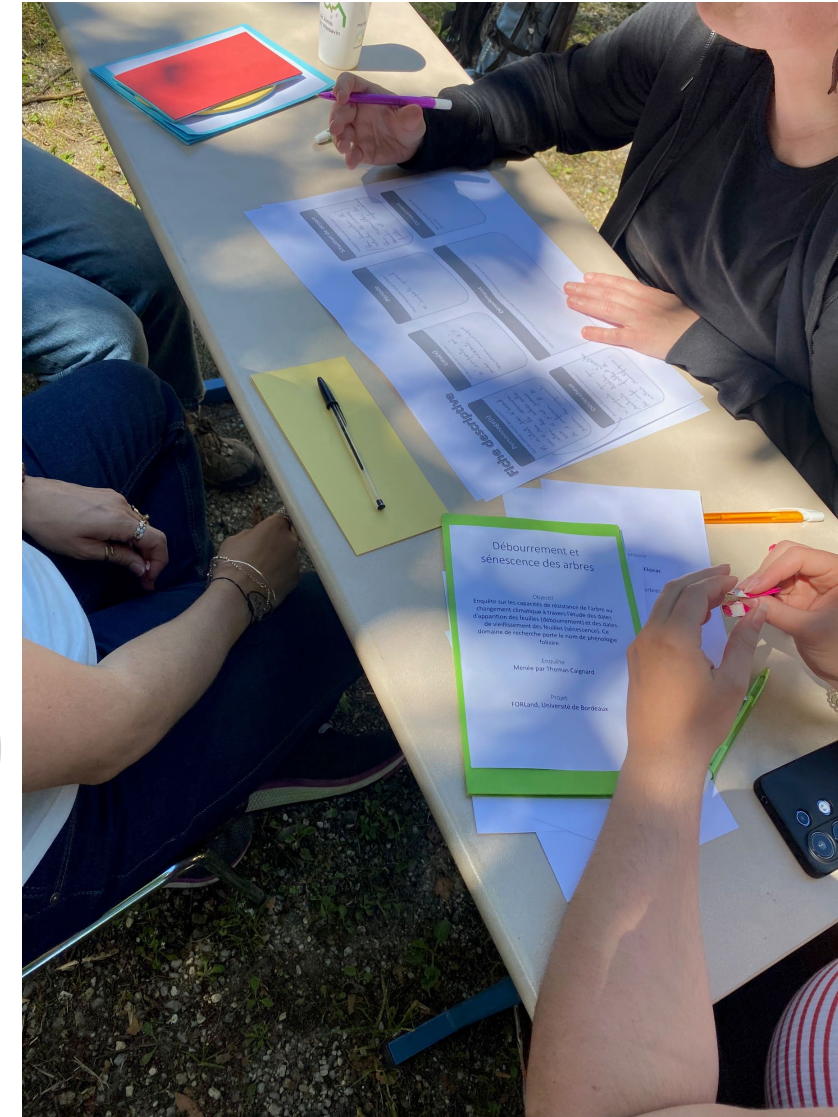
- 48 + 68 people: 116
- Steering committee, naturalists, tree guides, transition ambassadors, librarians, corporate table tennis team
- adults

Participants



- 18 compasses
- 18 iterations

Compasses



Fiche descriptive

Personnage(s) Qui va utiliser notre Boussole ? M. n'était pas d'accord avec H sur la communication des arbres entre eux. H s'est promis de s'informer et de trouver des arguments.	Lieu(x) Où Boussole sera utilisée ? N'importe où, mais nécessité d'une connexion numérique.	Période Quand Boussole serait utilisée ? N'importe quand.	Situation de départ Pourquoi Boussole serait utile ? Pour démocratiser la recherche, les sciences, Pour rassembler des données et informations fiables, démocratisées et actuelles.
Déclencheur Pourquoi Boussole serait utilisée ? N'importe qui qui souhaite accéder à l'ensemble des infos fiables de nature scientifiques.	Déroulement Que se passe-t-il quand le personnage de votre histoire utilise Boussole ? H. se connecte à Boussole en rentrant. Il tape "communication des arbres entre eux". Plusieurs possibilités de réponses apparaissent sur 1 Padlet: entre autres possibilité de Tchat avec des chercheurs, fiches / schéma simplifiés, vidéo, audio, référence de livres, jeu téléchargeable...	Dénouement Qu'aura permis l'utilisation de Boussole ? la science fait des recherches, elle n'est actuellement pas en mesure de donner une réponse.	

18 Compasses

Educational kit, exhibition, controversy website, generative AI, non-generative AI, website for notaries, forest trail, etc.

Beatrice, Sebastian, Juliane

Storyboard

page _ / _

Panel 1: Méthodologie musicale. Bête aux schémas et couleurs.

Panel 2: Carte de territoire et territoire. CDI. Boussole. Peut être imprimé, empasé, partagé entre établissements.

Panel 3: Kit de médiation. Données. Méthode. Sélection biblio de docs complémentaires. Liste de contacts. Notes des précédents enseignants. Format A4. Police 12 minimum. Formes plutôt que couleurs.

Panel 4: Stéphane est un professeur à lycée (SVT). Il est daltonien et portable depuis plus récemment.

Panel 5: Boussole est un kit pédagogique qui permet d'organiser un atelier avec ses élèves dans le cadre de sa classe.

Panel 6: Stéphane organise une brölade scientifique. Sa collègue Emma, prof de langue, organise avec la même chose un atelier slam.

Panel 7: Tout le monde est content. Organiser des rencontres avec des chercheurs ou membres d'Écologie par la suite (voir liste de contacts).

18 iterations

« Bibliocompatibility »?

Based on six standard "Compasses": guide, mobile app, website, AI, exhibition-tour, educational kit, capsules

Application mobile

Boussole est une application où les chercheurs peuvent promouvoir leurs campagnes de science participative. Les participants trouvent un projet auquel participer. Le projet scientifique est présenté avec un texte d'introduction et le site met en avant les résultats et des données clés. Les participants eux-mêmes sont valorisés.

Matérialité : numérique
Contenu : projets de recherche
Objectif : participatif
Bonus : Forum/chat

bibliothécompatibilité

On a déjà testé ça	Cela paraît difficile
On pourrait le faire	Impossible

Votre boussole

Que faut-il améliorer ?	Que faut-il changer ?
Que faut-il ajouter ?	Que faut-il enlever ?

Racontez-nous ça sur le storyboard.....

From Iterations to metadata

Three main concerns regarding access to scientific data.

- *Accessibility of information (adaptation to disabilities, complexity of information, information overload, location of information),*
- *The reliability of sources (for personal information, in cases of controversy, for children's education, in cases of crisis (fire), to be able to choose one's actions)*
- *The practicality of information (to be able to act: to protect the forest, to act in the event of a fire, to protect biodiversity, to anticipate risks).*

Need: clarification of documents through explanation (graphics, methodologies, concepts, and vocabulary) and clearer expression of the research context and issues at stake.

The real by destiny

Seven categories of devices were designed: exhibitions, guides, mobile applications, websites, artificial intelligence, video clips, and educational kits.

Each tool reveals the expectations and intended uses for science and its data from the perspective of laypeople.

The metadata describing the project and scientific documents will need to be adapted to the final form chosen for the tool and the place it gives to research projects.

Case #1: The scientific project is central, and the scientific narrative as presented by scientists will be the axis around which all readings will be constructed.

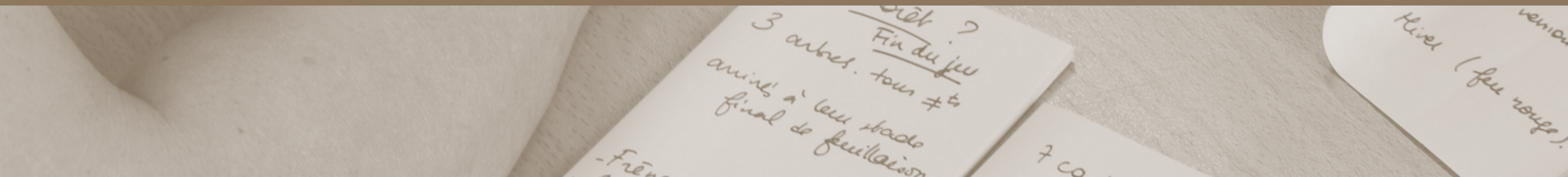
Case 2: The scientific project disappears in favor of a set of reliable information from various sources and of various kinds, so the scientific narrative becomes one possible reading path rather than the axis structuring the entire reading.

The manifestation of real by destiny = that is, realities conceived through their use and purpose, rather than through lived experience.



credit: Emilie Clement

What now?



New metadata : some examples

Methodology. Demonstrate the scientific approach by showing the context, protocol, collection, analysis, and results.

Location. Show the geographical location of the data through different data.

Date. Demonstrate the temporality involved in data collection and construction.

Population. Show average statistical data relating to a population as a whole.

Individual. Rather than showing statistical averages, show that these are composed of sub-samples.

Data, and its extracted sub-data. Show how the collection of data can give rise to multiple "sub-data."

Environment and/or conditions (e.g., weather). In cases where the subject's environment is relevant, show its impact.

Parameter alterations. Point out how changes in parameters (protocol, environmental, population, qualitative or quantitative) create differentials.

Transformation. Whether in one direction or another (increase vs. decrease), show how data can be manipulated in either direction.

Continuity (non-transformation). Conversely, data may remain unchanged in many operations and analyses; show where it appears each time.

Relationship to the machine. Point out what is acquired without direct human intervention, what is programmed, and what tools are used.

Relationships, metadata, narratives: 2/2



Next steps

These sensitive readings enabled us to **negotiate metadata** between researchers and laypeople. Now we need to:

- 1/ Finalize the mapping by adding new metadata categories to describe the documents
- 2/ Use this metadata to create varied reading paths between all documents in the final tool that will be created at the end of the project
- 3/ Conduct workshops to validate these visualizations with participants.

THANK YOU!

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Media metadata

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